

FORM PTO-1330 (Rev. 10-95)

U.S. DEPARTMENT OF COMMERCE PATENT AND TRADEMARK OFFICE

ATTORNEY'S DOCKET NUMBER

**TRANSMITTAL LETTER TO THE UNITED STATES
DESIGNATED/ELECTED OFFICE (DO/EO/US)
CONCERNING A FILING UNDER 35 U.S.C. 371**

1417

U.S. APPLICATION NO. (IF KNOWN, SEE 37 CFR

09/744084

INTERNATIONAL APPLICATION NO.
PCT/DE 99/02245

INTERNATIONAL FILING DATE
JULY 23, 1999

PRIORITY DATE CLAIMED
JULY 24, 1998

TITLE OF INVENTION

METHOD FOR TRANSMITTING USEFUL DIGITAL DATA

APPLICANT(S) FOR DO/EO/US

Dirk LAPPE, Martin HANS, Josef LAUMEN

Applicant herewith submits to the United States Designated/Elected Office (DO/EO/US) the following items and other information:

1. ☒ This is a **FIRST** submission of items concerning a filing under 35 U.S.C. 371.
2. ☐ This is a **SECOND** or **SUBSEQUENT** submission of items concerning a filing under 35 U.S.C. 371.
3. ☐ This is an express request to begin national examination procedures (35 U.S.C. 371(f)) at any time rather than delay examination until the expiration of the applicable time limit set in 35 U.S.C. 371(b) and PCT Articles 22 and 39(1).
4. ☒ A proper Demand for International Preliminary Examination was made by the 19th month from the earliest claimed priority date.
5. ☒ A copy of the International Application as filed (35 U.S.C. 371 (c) (2))
 - a. ☐ is transmitted herewith (required only if not transmitted by the International Bureau).
 - b. ☒ has been transmitted by the International Bureau.
 - c. ☐ is not required, as the application was filed in the United States Receiving Office (RO/US).
6. ☒ A translation of the International Application into English (35 U.S.C. 371(c)(2)).
7. ☐ A copy of the International Search Report (PCT/ISA/210).
8. ☐ Amendments to the claims of the International Application under PCT Article 19 (35 U.S.C. 371 (c)(3))
 - a. ☐ are transmitted herewith (required only if not transmitted by the International Bureau).
 - b. ☐ have been transmitted by the International Bureau.
 - c. ☐ have not been made; however, the time limit for making such amendments has NOT expired.
 - d. ☐ have not been made and will not be made.
9. ☐ A translation of the amendments to the claims under PCT Article 19 (35 U.S.C. 371(c)(3)).
10. ☒ An oath or declaration of the inventor(s) (35 U.S.C. 371 (c)(4)).
11. ☐ A copy of the International Preliminary Examination Report (PCT/IPEA/409).
12. ☐ A translation of the annexes to the International Preliminary Examination Report under PCT Article 36 (35 U.S.C. 371 (c)(5)).

Items 13 to 18 below concern document(s) or information included:

13. ☒ An Information Disclosure Statement under 37 CFR 1.97 and 1.98.
14. ☐ An assignment document for recording. A separate cover sheet in compliance with 37 CFR 3.28 and 3.31 is included.
15. ☒ A **FIRST** preliminary amendment.
A **SECOND** or **SUBSEQUENT** preliminary amendment.
16. ☐ A substitute specification.
17. ☐ A change of power of attorney and/or address letter.
18. ☒ Certificate of Mailing by Express Mail
19. ☐ Other items or information:

F215952723 WJ

U.S. APPLICATION NO. (IF KNOWN, SEE 37 CFR) <div style="font-size: 24pt; font-weight: bold;">09/744084</div>	INTERNATIONAL APPLICATION NO. <div style="font-weight: bold;">PCT/DE 99/02245</div>	ATTORNEY'S DOCKET NUMBER <div style="font-weight: bold;">1417</div>
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20. The following fees are submitted:.
- BASIC NATIONAL FEE (37 CFR 1.492 (a) (1) - (5)) :**
- ☐ Search Report has been prepared by the EPO or JPO \$930.00
 - ☐ International preliminary examination fee paid to USPTO (37 CFR 1.482) \$720.00
 - ☐ No international preliminary examination fee paid to USPTO (37 CFR 1.482) but international search fee paid to USPTO (37 CFR 1.445(a)(2)) \$790.00
 - ☒ Neither international preliminary examination fee (37 CFR 1.482) nor international search fee (37 CFR 1.445(a)(2)) paid to USPTO \$1,070.00
 - ☐ International preliminary examination fee paid to USPTO (37 CFR 1.482) and all claims satisfied provisions of PCT Article 33(2)-(4) \$98.00

CALCULATIONS PTO USE ONLY

ENTER APPROPRIATE BASIC FEE AMOUNT =

\$1,000.00

Surcharge of **\$130.00** for furnishing the oath or declaration later than ☐ 20 ☐ 30 months from the earliest claimed priority date (37 CFR 1.492 (e)).

\$0.00

CLAIMS	NUMBER FILED	NUMBER EXTRA	RATE		
Total claims	7 - 20 =	0	x \$18.00	\$0.00	
Independent claims	1 - 3 =	0	x \$80.00	\$0.00	
Multiple Dependent Claims (check if applicable).				<input type="checkbox"/>	\$0.00

TOTAL OF ABOVE CALCULATIONS =

\$1,000.00

Reduction of 1/2 for filing by small entity, if applicable. Verified Small Entity Statement must also be filed (Note 37 CFR 1.9, 1.27, 1.28) (check if applicable). ☐

\$0.00

SUBTOTAL =

\$1,000.00

Processing fee of **\$130.00** for furnishing the English translation later than ☐ 20 ☐ 30 months from the earliest claimed priority date (37 CFR 1.492 (f)).

\$0.00

TOTAL NATIONAL FEE =

\$1,000.00

Fee for recording the enclosed assignment (37 CFR 1.21(h)). The assignment must be accompanied by an appropriate cover sheet (37 CFR 3.28, 3.31) (check if applicable). ☐

\$0.00

TOTAL FEES ENCLOSED =

\$1,000.00

Amount to be:	\$
refunded	
charged	\$

- ☐ A check in the amount of _____ to cover the above fees is enclosed.
- ☒ Please charge my Deposit Account No. **19-4675** in the amount of **\$1,000.00** to cover the above fees.
A duplicate copy of this sheet is enclosed.
- ☒ The Commissioner is hereby authorized to charge any fees which may be required, or credit any overpayment to Deposit Account No. **19-4675** A duplicate copy of this sheet is enclosed.

NOTE: Where an appropriate time limit under 37 CFR 1.494 or 1.495 has not been met, a petition to revive (37 CFR 1.137(a) or (b)) must be filed and granted to restore the application to pending status.

SEND ALL CORRESPONDENCE TO:

**STRIKER, STRIKER & STENBY
103 EAST NECK ROAD
HUNTINGTON, NEW YORK 11743**

SIGNATURE

MICHAEL J. STRIKER

NAME

27233

REGISTRATION NUMBER

JANUARY 19, 2001

DATE

09/744084

JC02 Rec'd PCT/PTO 19 JAN 2001

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Examiner: Art Unit: Docket No.:

In RE: U.S. National Stage Application of D. LAPPE, et al

Ser. No.: Crsp. To PCT/DE 99/02245

Filed: Simultaneously with entry into U.S. National Stage

January 19, 2001

SIMULTANEOUS AMENDMENT

Hon. Commissioner of Patents

and Trademarks,

Washington, D.C. 20231

Sir:

In ADVANCE of Examination on the merits, please make the following changes and consider the following REMARKS:

In the Specification:

Please delete pages 1 and 2 in their entirety and substitute therefore the following:

-- Background of the Invention

1. Field of the Invention

The invention relates to a method for transmitting useful digital data from a first mobile station to a second mobile station.

2. Prior Art

Methods for transmitting useful digital data from a first mobile station to a second mobile station are already known and are embodied for voice transmission, for example, in accordance with the GSM standard (Global System for Mobile Communications).

EP 0 849 965 A1 has disclosed a telephone device, which can telephone in a particularly advantageous manner in enclosed spaces via both an existing mobile radio network and a fixed telecommunication network with the aid of a dual-mode base station. The dual-mode base station, which can also be referred to as a twin station, has a DECT charging station and a DCS/GSM charging station with a voice interface. By plugging the DCS/GSM mobile station into the dual-mode base station, the mobile station is given the ability to receive mobile radio signals. These mobile radio signals are then converted into DECT signals. The connection to the DECT mobile phone is then established via a DECT

antenna. In a similar manner, the PSDN/ISDN signals are also converted and emitted via DECT.

Summary of the Invention

It is an object of the present invention to provide an improved method of transmitting useful digital data between mobile stations.

The method according to the invention has advantages has the following advantageous features: that for the transmission in a first telecommunication network, the first mobile station encodes, preferably source encodes, the useful data in a first step and encodes, preferably channel encodes, the useful data in a second step, that the useful data encoded in the first and second steps are transmitted in the form of a first bit stream to an intermediary station via a transmission channel of the first telecommunication network, in particular via at least one third telecommunication network, that the useful data of the --.

Page 13, line 4, please delete "40" and substitute therefore -- 35 --.

In the Abstract:

Please cancel the current abstract and substitute therefore the following:

-- ABSTRACT OF THE DISCLOSURE

The method for transmitting useful digital data from a first (1) to a second mobile station (5) saves computing costs and prevents data loss. In this method for transmission in a first network (10), the first station (1) source encodes useful data in a first step and then channel encodes the source encoded useful data in a second step. The encoded useful data are transmitted as a first bit stream to an intermediary station (15) via a transmission channel of the first network (10). The encoded useful data in the first bit stream are channel decoded by the intermediary station (15). For transmission in a second network (20), the useful data are again channel encoded by the intermediary station (15) and are transmitted to a second mobile station (5) via a transmission channel of the second network (20). Signalization data containing information regarding the encoding in the first step are transmitted from the intermediary station (15) to the second mobile station (5). The useful data coded in the second step are channel decoded by the second mobile station (5). The resulting channel decoded useful data are then source decoded by the second mobile station (5) according to signalization data received by the second mobile station (5). --.

In the Claims:

Please cancel claims 1 to 7 without prejudice and add the following claims 8 to 22:

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8. A method for transmitting useful digital data from a first mobile station (1) to a second mobile station (5), in which for transmission in a first telecommunication network (10), the first mobile station (1) source encodes useful data in a first step and then channel encodes the useful data in a second step; the useful data encoded in the first and second steps are transmitted in the form of a first bit stream to an intermediary station (15) via a transmission channel of the first telecommunication network (10); the useful data channel coded in the second step present in the first bit stream are channel decoded by the intermediary station (15); for transmission in a second telecommunication network (20), the useful data are channel encoded by the intermediary station (15) and the useful data thus channel encoded are transmitted to a second mobile station (5) via a transmission channel of the second telecommunication network (20), signalization data are transmitted from the intermediary station (15) to the second mobile station (5), said signalization data containing information regarding the type of encoding of the useful data in the first step, the useful data channel coded in the intermediary station are channel decoded by the second mobile station (5), and then the useful data channel decoded by the second mobile station (5) are source decoded by the second mobile station (5), according to the signalization data received by the second mobile station (5).

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9. The method according to claim 8, wherein the useful data encoded in the first and second steps are transmitted in the form of said first bit stream to said intermediary station (15) via at least one third telecommunication network.

FIG. 10 is a block diagram of a communication system according to claim 10. The system includes a first mobile station (1), a second mobile station (5), an intermediary station (15), a first telecommunication network (10), and a second telecommunication network (20). The first mobile station (1) is connected to the first telecommunication network (10). The second mobile station (5) is connected to the second telecommunication network (20). The intermediary station (15) is connected to both the first and second telecommunication networks (10, 20). The first telecommunication network (10) is connected to the second telecommunication network (20) via a transmission channel.

1 10. The method according to claim 8, wherein the signalization data are added
2 to the useful data channel decoded in the intermediary station (15) so that a
3 second bit stream is produced for the transmission in said second
4 telecommunication network (20), the useful data and the signalization data of the
5 second bit stream are channel encoded by the intermediary station (15); the
6 useful data and the signalization data of the second bit stream are transmitted to
7 the second mobile station (5) via a transmission channel of the second
8 telecommunication network (20); the useful data and the signalization data of the
9 second bit stream are channel decoded by the second mobile station (5) and
10 then the useful data, which are channel decoded in the second step by the
11 second mobile station (5), are source decoded by the second mobile station (5)
12 according to the signalization data decoded by the second mobile station (5).

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1 11. A method for transmitting useful digital data from a first mobile station (1) to
2 a second mobile station (5), in which for transmission in a first telecommunication
3 network (10), the first mobile station (1) encodes useful data in a first step and
4 then encodes the useful data in a second step; the useful data encoded in the
5 first and second steps are transmitted in the form of a first bit stream to an
6 intermediary station (15) via a transmission channel of the first
7 telecommunication network (10); the useful data coded in the second step
8 present in the first bit stream are decoded by the intermediary station (15); for
9 transmission in a second telecommunication network (20), the useful data are
10 channel encoded by the intermediary station (15) and then are transmitted to a

11 second mobile station (5) via a transmission channel of the second
12 telecommunication network (20); signalization data are transmitted from the
13 intermediary station (15) to the second mobile station (5), said signalization data
14 containing information regarding the type of encoding of the useful data in the
15 first step, the useful data coded in the intermediary station are decoded by the
16 second mobile station (5) and then the useful data coded in the first step are
17 decoded by the second mobile station (5), according to the signalization data
18 received by the second mobile station (5).

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1 12. The method according to claim 11, wherein the useful data encoded in the
2 first and second steps are transmitted in the form of said first bit stream to said
3 intermediary station (15) via at least one third telecommunication network.

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1 13. The method according to claim 11, wherein the signalization data are added
2 to the useful data coded in the second step and decoded in the intermediary
3 station (15) so that a second bit stream is produced for transmission in said
4 second telecommunication network (20), the useful data and the signalization
5 data of the second bit stream are encoded by the intermediary station (15), the
6 useful data and the signalization data of the second bit stream are transmitted to
7 the second mobile station (5) via a transmission channel of the second
8 telecommunication network (20), the useful data coded in the second step and
9 the signalization data of the second bit stream are decoded by the second mobile
10 station (5), and the useful data coded in the first step, which are decoded in the

11 second step by the second mobile station (5), are decoded by the second mobile
12 station (5) according to the signalization data decoded by the second mobile
13 station (5).

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1 14. The method according to claim 8 or 11, wherein the signalization data are
2 transmitted from said intermediary station (15) to said second mobile station (5)
3 singly or multiply via a separate control channel.

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1 15. The method according to claim 8, 10, 11 or 13, further comprising
2 transmitting a telephone number of the first mobile station (1) along with said
3 signalization data containing said information regarding said type of encoding of
4 the useful data in the first step.

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1 16. The method according to claim 8 or 11, wherein said useful data comprises
2 at least one of video data, audio data, text data and voice data.

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1 17. The method according to claim 8, wherein the useful data in the first
2 telecommunication network (10) are transmitted in accordance with a first mobile
3 radio standard; the useful data are source encoded and channel encoded in the
4 first and second step respectively, the useful data in the second
5 telecommunication network are channel encoded and are transmitted in
6 accordance with a second mobile radio standard together with the signalization
7 data, said signalization data include said information regarding the type of

8 encoding of the useful data in the first step in accordance with the first mobile
9 radio standard; and wherein the useful data coded in the second step, which are
10 decoded by the second mobile station (5), are decoded by the second mobile
11 station (5) in accordance with the first mobile radio standard after evaluating the
12 signalization data.

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1 18. The method according to claim 17, wherein said first mobile radio standard is
2 global system for mobile communications and said second mobile radio standard
3 is universal mobile telecommunications system.

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1 19. The method according to claim 17, wherein the useful data in the first mobile
2 station (1) are source encoded by a voice encoder (25) according to GSM
3 standard ITU-T G.729 and wherein the useful data in the second mobile station
4 (5) are source decoded by a voice decoder (30) in accordance with the first
5 mobile radio standard.

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1 20. The method according to claim 11, wherein the useful data in the first
2 telecommunication network (10) are transmitted in accordance with a first mobile
3 radio standard; the useful data are source encoded and channel encoded in the
4 first and second step, the useful data coded in the second telecommunication
5 network are channel encoded and are transmitted in accordance with a second
6 mobile radio standard together with the signalization data, said signalization data
7 include said information regarding the type of encoding of the useful data in the

8 first step in accordance with the first mobile radio standard; and wherein the
9 useful data coded in the second step, which are decoded by the second mobile
10 station (5), are decoded by the second mobile station (5) in accordance with the
11 first mobile radio standard after evaluating the signalization data.

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1 21. The method according to claim 20, wherein said first mobile radio standard is
2 global system for mobile communications and said second mobile radio standard
3 is universal mobile telecommunications system.

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1 22. The method according to claim 20, wherein the useful data in the first mobile
2 station (1) are source encoded by a voice encoder (25) according to GSM
3 standard ITU-T G.729 and wherein the useful data in the second mobile station
4 (5) are source decoded by a voice decoder (30) in accordance with the first
5 mobile radio standard.

REMARKS

This is a simultaneous amendment for the U.S. National Stage Application
corresponding to PCT/DE 99/02245.

Changes have been made in the specification to insert the amended
pages from the International Application. It is unnecessary to replace the entire
page 13, because only a single reference number differs from the original page.
However some changes in wording have been made to comply with U.S. Patent
Office Rules. References to claims have been deleted, for example.

The original abstract contained wording that is generally objected to in U.S. Patent Practice. The original abstract has been canceled and replaced by the above abstract that is drafted according to U.S. Patent Office Rules.

Original claims 1 to 7 contained wording that is considered indefinite in U.S. Patent Practice. The terms “in particular” or “preferably” lead to claims of indefinite scope and generally cause a rejection of claims as indefinite. Furthermore the original claims 1 to 7 contain parentheses, which are not permitted. Also they contain multiple claim dependencies that are not permitted. Furthermore there were numerous instances of terms in the English translations of the original claims without proper antecedent basis.

Claims 8 to 22 have been filed and claims 1 to 7 have been canceled. The new claims 8 to 22 contain the same subject matter as claims 1 to 7 but the above-mentioned indefinite wording has been eliminated from the new claims 8 to 22.

Claims 8 to 10 correspond to canceled claims 1 to 2 and were obtained generally by deleting the term “preferably” from the canceled claims, so that e.g. the first mobile station source encodes and channel encodes the useful data in the first and second steps. Also the first and second steps of the claimed method are assumed to refer only to the coding processes in the transmitting mobile station 1, so that wording has been modified accordingly. There is seemingly no distinction in the claims regarding different locations for e.g. a “second” step, i.e. in the transmitting station, the intermediary station or the receiving station.

Claims 11 to 13 contain the same subject matter as claims 8 to 10 except that the respective phrases beginning "preferably" have been deleted, so that these claims are broader than claims 8 to 10.

Dependent claims 14, 15 and 16 correspond to canceled claims 3, 4 and 5 respectively.

Dependent claims 17 and 18 or 20 and 21, and 19 or 22 correspond to canceled claims 6 and 7 respectively.

Should the Examiner require or consider it advisable that the specification, claims and/or drawing be further amended or corrected in formal respects to put this case in condition for final allowance, then it is requested that such amendments or corrections be carried out by Examiner's Amendment and the case passed to issue. Any costs involved should be charged to the deposit account of the undersigned (No. 19-4675). Alternatively, should the Examiner feel that a personal discussion might be helpful in advancing the case to allowance, he or she is invited to telephone the undersigned at 1-631-549 4700.

In view of the foregoing, favorable allowance is respectfully solicited.

Respectfully submitted,



Michael J. Striker,
Attorney for the Applicants

Reg. No. 27,233

1/PRB

- 1 -

09/744084

JCO2 Rec'd PCT/PTO 19 JAN 2001

Method for Transmitting Useful Digital Data

Prior Art

The invention is based on a method for transmitting useful digital data as generically defined by the main claim.

Methods for transmitting useful digital data from a first mobile station to a second mobile station are already known and are embodied for voice transmission, for example, in accordance with the GSM standard (Global System for Mobile Communications).

Advantages of the Invention

The method according to the invention, with the features of the main claim, has the advantage over the prior art that for the transmission in a first telecommunication network, the first mobile station encodes, preferably source encodes, the useful data in a first step and encodes, preferably channel encodes the useful data in a second step, that the useful data encoded in the first and second steps

are transmitted in the form of a first bit stream to an intermediary station via a transmission channel of the first telecommunication network, in particular via at least one third telecommunication network, that the useful data of the

[illegible]

first bit stream are decoded, preferably channel decoded, by the intermediary station in the second step, that for the transmission in a second telecommunication network, the useful data are encoded, preferably channel encoded, by the intermediary station in the second step, that the useful data are transmitted to the second mobile station via a transmission channel of the second telecommunication network, that signalization data are transmitted from the intermediary station to the second mobile station, wherein the signalization data contain information regarding the type of encoding of the useful data in the first step, that the useful data are decoded, preferably channel decoded, by the second mobile station in the second step, and that the useful data decoded by the second mobile station in the second step are decoded, preferably source decoded, by the second mobile station in the first step, depending on the signalization data received by the second mobile station. In this manner, the useful data received in the intermediary station are only decoded in the second step, but not in the first step. Then an encoding in the first step for the transmission of the useful data in the second telecommunication network is not necessary. A decoding in the first step of the useful data received in the second mobile station can then take place through the evaluation of the signalization data transmitted along with the useful

data by the intermediary station. A transcoding between different codes for the encoding in the first step for transmission in the respective telecommunication network can consequently be avoided, which can save computing costs and prevent the loss of useful data that occurs during a transcoding.

Advantageous improvements and updates of the method disclosed in the main claim are possible through the measures taken in the dependent claims.

It is particularly advantageous that the useful data in the first telecommunication network are transmitted in accordance with a first mobile radio standard, in particular in accordance with the GSM standard (Global System for Mobile Communications), encoded, preferably source encoded and channel encoded, in the first and second step, that the useful data in the second telecommunication network are encoded, preferably channel encoded, in the second step and are transmitted in accordance with a second mobile radio standard, in particular in accordance with the UMTS standard (Universal Mobile Telecommunications System), together with the signalization data, which include information regarding the encoding of the useful data in the first step in accordance with the first mobile radio standard, and that the useful data, which are decoded, preferably channel decoded, by the second mobile station in the second step, are decoded, preferably source decoded, by the second mobile station in accordance with the first mobile radio standard after the evaluation of the signalization data. In this manner, useful data can be transmitted between mobile stations with a respective air interface embodied according to a different mobile radio standard without which a transcoding of the useful data with regard to the code for the encoding in the first step would be required, provided that the second mobile station which receives the useful

data is in a position to execute a decoding of the received useful data in the first step in accordance with the first mobile radio standard.

Drawing

An exemplary embodiment of the invention is shown in the drawing and will be described in detail in the subsequent description.

The sole Fig. is a block circuit diagram for the transmission of useful data from a first mobile station

to a second mobile station via an intermediary station by means of different telecommunication networks.

Description of the Exemplary Embodiment

In the Fig., the reference numeral 1 indicates a first mobile station, which is embodied in accordance with a first mobile radio standard. The first mobile radio standard can, for example, be the GSM standard (Global System for Mobile Communications). The first mobile station 1 will be referred to below as a GSM mobile station. The Fig. shows only those functional blocks of the first mobile station 1 that are required for the description of the method according to the invention. The first mobile station 1 includes an encoder 25 embodied as a source encoder for an encoding in a first step which encoder is embodied in accordance with the first mobile radio standard, the GSM standard in the example described. By means of a first encoder 35 embodied as a channel encoder for an encoding in a second step, which encoder is likewise embodied in accordance with the first mobile radio standard, the source encoder 25 is connected to a first send-receive unit 40, which is connected to a first send-receive antenna 45. Radio signals can be transmitted by the first send-receive antenna 45 to a second send-receive

antenna 50 of an intermediary station 15 in accordance with the first mobile radio standard by means of a first telecommunication network 10 which is embodied as a GSM network in the exemplary embodiment described. The intermediary station 15 contains a second send-receive unit 55, which is connected to the second send-receive antenna 50. The second send-receive unit 55 is connected to a first decoder 60 embodied as a channel decoder for a decoding in the second step, which is connected to a control unit 65 of the intermediary station 15. By means of a second encoder 70 embodied as a

channel encoder for the encoding in the second step, the control unit 65 is connected to a third send-receive unit 75 of the intermediary station 15, which is connected to a third send-receive antenna 80. The third send-receive antenna 80 transmits radio signals to a second mobile station 5 in accordance with a second mobile radio standard by means of a second telecommunication network 20. The second mobile radio standard can, for example, be the UMTS standard (Universal Mobile Telecommunications System). For the intermediary station 15 as well, the Fig. shows only the functional blocks required for the description of the method according to the invention. The same is true for the second mobile station 5, which receives the radio signals from the intermediary station 15 by means of a fourth send-receive antenna 85. The second mobile station 5 includes a fourth send-receive unit 90 which is connected to the fourth send-receive antenna 85. The fourth send-receive unit 90 is also connected to a second decoder 95 embodied as a channel decoder for the decoding in the second step, which is connected to an evaluation unit 100. By means of a switch 105 that can be controlled by the evaluation unit 100, the second channel decoder 95 is connected either to a first decoder 30 embodied as a source decoder for a decoding in the first step or to a second decoder 110 embodied as a source decoder for the decoding in the first step. The first

source decoder 30 is embodied in accordance with the first mobile radio standard and the second source decoder 110 is embodied in accordance with the second mobile radio standard. In the following, the UMTS standard has been selected by way of example for the second mobile radio standard so that the second mobile station 5 is at least partially embodied as a GSM/UMTS mobile station. The source encoder 25 is supplied with useful digital data,

[illegible]

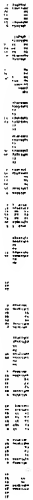
which can be video data, audio data, text data, voice data, and/or any other data. In the following, the transmission of useful data between the first mobile station 1 and the second mobile station 5 will be described by way of example in conjunction with the transmission of voice data. The source encoder 25 is then embodied as a voice encoder according to the first mobile radio standard, the GSM standard in this example. As a result, the voice encoder 25 can be based on the GSM standard ITU-T G.729. The voice encoder 25 executes a source encoding of the useful data, which are supplied to it and are embodied as voice data, in accordance with the GSM standard. The voice data source encoded in this manner are supplied to the first channel encoder 35, which executes a channel encoding of the voice data, for example a folding encoding and a block encoding, in accordance with the GSM standard. The voice data source encoded and channel encoded in this manner are then transmitted via the first send-receive unit 40 from the first send-receive antenna 45 to the intermediary station 15 in the form of a first bit stream by means of a first transmission channel of the first telecommunication network 10 embodied as a GSM network. The bit stream received by the second send-receive antenna 50 is then supplied to the first channel decoder 60 via the second send-receive unit 55. The first send-receive antenna 45, together with the second

send-receive antenna 50, thereby constitutes a so-called GSM air interface. The source encoded and channel encoded voice data of the first bit stream are then channel decoded in the first channel decoder 60 in accordance with the GSM standard. The voice data channel decoded in this manner are then source encoded again and are supplied to the control unit 65. Along with the voice data, the first mobile station 1 has also transmitted call identification data to the intermediary station 15, which identify the second mobile station 5 as the targeted subscriber for the

1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31 32 33 34 35 36 37 38 39 40 41 42 43 44 45 46 47 48 49 50 51 52 53 54 55 56 57 58 59 60 61 62 63 64 65 66 67 68 69 70 71 72 73 74 75 76 77 78 79 80 81 82 83 84 85 86 87 88 89 90 91 92 93 94 95 96 97 98 99 100

voice data to be transmitted. These call identification data have been generated, for example, in a control unit, not shown in the drawing, of the first mobile station 1, are channel encoded by the first channel encoder 40, and are transmitted along with the voice data to the intermediary station 15 in the first bit stream. Together with the voice data, these call identification data are then also channel decoded by the first channel decoder 60 and likewise supplied to the control unit 65. The call information data can also be transmitted from the first mobile station 1 to the intermediary station 15 singly or multiply via a separate control channel, separate from the voice data and include the telephone number of the second mobile station 5 as the target station. The control unit 65 detects these call identification data and based on these data, designates the second mobile station 5 as the target subscriber for the voice data to be transmitted from the first mobile station 1. In this connection, it is known in the control unit 65 that in order to transmit the voice data from the intermediary station 15 to the second mobile station 5, a transmission channel must be established in the second telecommunication network 20. The transmission of voice data in the second telecommunication network 20 occurs in accordance with the second mobile radio standard, the UMTS standard in the exemplary embodiment described. The third

send-receive antenna 80 and the fourth send-receive antenna 85 consequently constitute a UMTS air interface. It is also known in the control unit 65 that the second mobile station 5 can decode both useful signals source encoded in accordance with the GSM standard and useful signals source encoded in accordance with the UMTS standard. The control unit 65 therefore selects a data transmission service in accordance with the UMTS standard in which the voice data, which have been channel decoded but are still source encoded in accordance with the GSM standard, are embedded in a second bit stream in accordance with the UMTS standard.



The intermediary station 15 can also have the potential for a source decoding of received useful data in accordance with the GSM standard. In this instance, along with the call identification data, it is useful to also transmit, for example, the telephone number of the calling first mobile station 1 to the intermediary station 15 and to forgo a source decoding of the received useful data in the intermediary station 15 depending on the detection of this telephone number in the control unit 65.

The control unit 65 also embeds signalization data into the second bit stream, wherein the signalization data contains information regarding the type of source encoding of the useful data. The signalization data consequently indicate that the useful data in the form of voice data in the example described are source encoded according to the GSM standard. In the second channel encoder 70, the voice data and the signalization data of the second bit stream are channel encoded according to the UMTS standard for transmission in the second telecommunication network 20, for example likewise by means of a folding encoding and a block encoding. The third send-receive unit 75 transmits the thus channel encoded voice data and signalization data of the second bit stream to the second mobile station 5 via a transmission channel of the second telecommunication network

which in this example, is embodied as a UMTS network. With the data transmission service selected by the control unit 65 in accordance with the UMTS standard, the transmission quality and the transmission data rate must be suitably selected in order to transmit the voice data which is still source encoded in accordance with the GSM standard. The second bit stream with the voice data and signalization data, which are channel encoded in accordance with the UMTS standard, is received by the fourth

send-receive antenna 85 and is supplied to the second channel decoder 95 by means of the fourth send-receive unit 90. The second channel decoder 95 executes a channel decoding of the voice data and the signalization data of the second bit stream in accordance with the UMTS standard. The evaluation unit 100 detects the channel decoded signalization data which do in fact contain known information regarding the type of source encoding of the received voice data of the second bit stream. In the current example, the evaluation unit 100 extracts from the channel decoded signalization data of the second bit stream the fact that the voice data of the second bit stream are source encoded in accordance with the GSM standard. The evaluation unit 100 therefore triggers the switch 105 in such a way that the second channel decoder 95 is connected to the first source decoder 30, which is embodied as a voice decoder in accordance with the GSM standard. For the case in which the evaluation unit 100 extracts from the received and channel decoded signalization data of the second bit stream the fact that the voice data of the second bit stream are source encoded in accordance with the UMTS standard, it triggers the switch 105 in such a way that it forms a connection - as depicted with dashed lines in the Fig. - between the second channel decoder 95 and the second source decoder 110, which is then embodied as a voice decoder in accordance with the

UMTS standard. According to the exemplary embodiment described, since the voice data of the second bit stream are source encoded in accordance with the GSM standard, the second channel decoder 95 is connected to the first voice decoder 30 and the voice data channel decoded in the second channel decoder 95 are source decoded in the first voice decoder 30. The channel decoded and source decoded voice signals present at the output of the first voice decoder 30 and the second voice decoder 110 are then supplied for further processing to additional function blocks not shown in the Fig.

FIG. 10 is a block diagram of a second exemplary embodiment of a system for processing voice data in accordance with the UMTS standard. The system includes a first voice decoder 30, a second voice decoder 110, a first channel decoder 90, a second channel decoder 95, a first bit stream 10, and a second bit stream 20. The first bit stream 10 is input to the first channel decoder 90, which outputs a channel decoded signal to the first voice decoder 30. The second bit stream 20 is input to the second channel decoder 95, which outputs a channel decoded signal to the second voice decoder 110. The output of the first voice decoder 30 is also input to the second voice decoder 110. The outputs of both the first and second voice decoders are supplied to additional function blocks (not shown) for further processing.

The signalization data can also be transmitted from the intermediary station 15 to the second mobile station 5 singly or multiply via a separate control channel separate from the useful data and in turn can include the telephone number of the first mobile station 1 making the call, by means of which the evaluation unit 100 can likewise be induced to connect the first voice decoder 30 to the second channel decoder 95.

In lieu of or in addition to the voice data, at least video data and/or audio data and/or text data can also be transmitted as useful data from the first mobile station 1 to the second mobile station 5 in the manner described above and combined into one bit stream. The transmission in the first telecommunication network 10 and in the second telecommunication network 20 can take place, for example, in a frequency multiplexed or time multiplexed manner, wherein different multiplexing methods can be used for the two different telecommunication networks 10, 20. In this instance, for example, a conversion from time multiplexing to frequency multiplexing or vice versa would also have to be achieved in the intermediary station 15. Arbitrary other multiplexing or channel access methods can also be used.

With the method according to the invention, it is consequently possible, for example, to transmit useful data that are source encoded according to the GSM standard via a data connection according to the UMTS standard. In this manner, a request for the UMTS standard as the mobile radio standard of the third generation can be fulfilled to assure a backwards compatibility to the existing GSM standard as the mobile radio standard of the second generation in order to exchange useful data between GSM standard mobile stations and UMTS standard mobile stations via a mobile radio connection. The method according to the invention

FIG. 1

simplifies the transmission of useful data between mobile stations embodied in accordance with the GSM standard and those mobile stations that are embodied in accordance with both the GSM standard and the UMTS standard, wherein the UMTS air interface is used for the part of the data transmission from the corresponding telecommunication network to the mobile station that is embodied in accordance with both the GSM standard and the UMTS standard. As a result, the useful data in the mobile station that is embodied in accordance with both the GSM standard and the UMTS standard are of a quality that has not been reduced by a transcoding between a GSM standard source code and a UMTS standard source code.

The first telecommunication network 10 and the second telecommunication network 20 can each be embodied as a hybrid GSM/UMTS network which combines the functions of a GSM network and a UMTS network. The first telecommunication network 10 and the second telecommunication network 20 can also be identical.

The provision can also be made that the useful data from the first telecommunication network 10 can be transmitted via one or a number of arbitrary fixed networks and possibly via corresponding intermediary stations, to the

second telecommunication network 20 and from there, on to the second mobile station 5, wherein a transcoding with regard to the source code of the useful data, i.e. a source decoding and new source encoding in the corresponding intermediary stations does not occur, but only a channel decoding and possibly, a new channel encoding.

For example, the standard IS95 provided in North America (Interim Standard 95), the PDC standard provided in Japan (Personal Digital Cellular), or the like can also be selected as the first mobile radio standard.

Claims

1. A method for transmitting useful digital data from a first mobile station (1) to a second mobile station (5), characterized in that for the transmission in a first telecommunication network (10), the first mobile station (1) encodes, preferably source encodes, the useful data in a first step and encodes, preferably channel encodes, the useful data in a second step, that the useful data encoded in the first and second steps are transmitted in the form of a bit stream to an intermediary station (15) via a transmission channel of the first telecommunication network (10), in particular via at least one third telecommunication network, that the useful data of the first bit stream are decoded, preferably channel decoded, by the intermediary station (15) in the second step, that for the transmission in a second telecommunication network (20), the useful data are encoded, preferably channel encoded, by the intermediary station (15) in the second step, that the useful data are transmitted to the second mobile station (5) via a transmission channel of the second telecommunication network (20), that signalization data are transmitted from the intermediary station (15) to the second mobile station (5), wherein the signalization data contain information regarding the type of encoding of the useful data in the first step,

that the useful data are decoded, preferably channel decoded, by the second mobile station (5) in the second step, and that the useful data decoded by the second mobile station (5) in the second step are decoded, preferably source decoded, by the second mobile station (5) in the first step, depending on the signalization data received by the second mobile station (5).

2. The method according to claim 1, characterized in that the signalization data are added to the useful data in the intermediary station (15) decoded in the second step so that a second bit stream is produced, that for the transmission in a second telecommunication network (20), the useful data and the signalization data of the second bit stream are encoded, preferably channel encoded, by the intermediary station (15) in the second step, that the useful data and the signalization data of the second bit stream are transmitted to the second mobile station (5) via a transmission channel of the second telecommunication network (20), that the useful data and the signalization data of the second bit stream are decoded, preferably channel decoded, by the second mobile station (5) in the second step, and that the useful data, which are decoded in the second step by the second mobile station (5), are decoded, preferably source decoded, by the second mobile

station (5) in the first step depending on the signalization data decoded by the second mobile station (5) in the second step.

3. The method according to claim 1, characterized in that the signalization data can be transmitted from the intermediary station (15) to the second mobile station (5) singly or multiply via a separate control channel.

4. The method according to claim 1, 2, or 3, characterized in that information regarding the type of encoding of the useful data in the first step, in the form of a telephone number of the first mobile station (1) can be transmitted along with the signalization data.

5. The method according to one of the preceding claims, characterized in that at least video data and/or audio data and/or text data and/or voice data can be transmitted as the useful data.

6. The method according to one of the preceding claims, characterized in that the useful data in the first telecommunication network (10) are transmitted in accordance with a first mobile radio standard, in particular in accordance with the GSM standard (Global System for Mobile

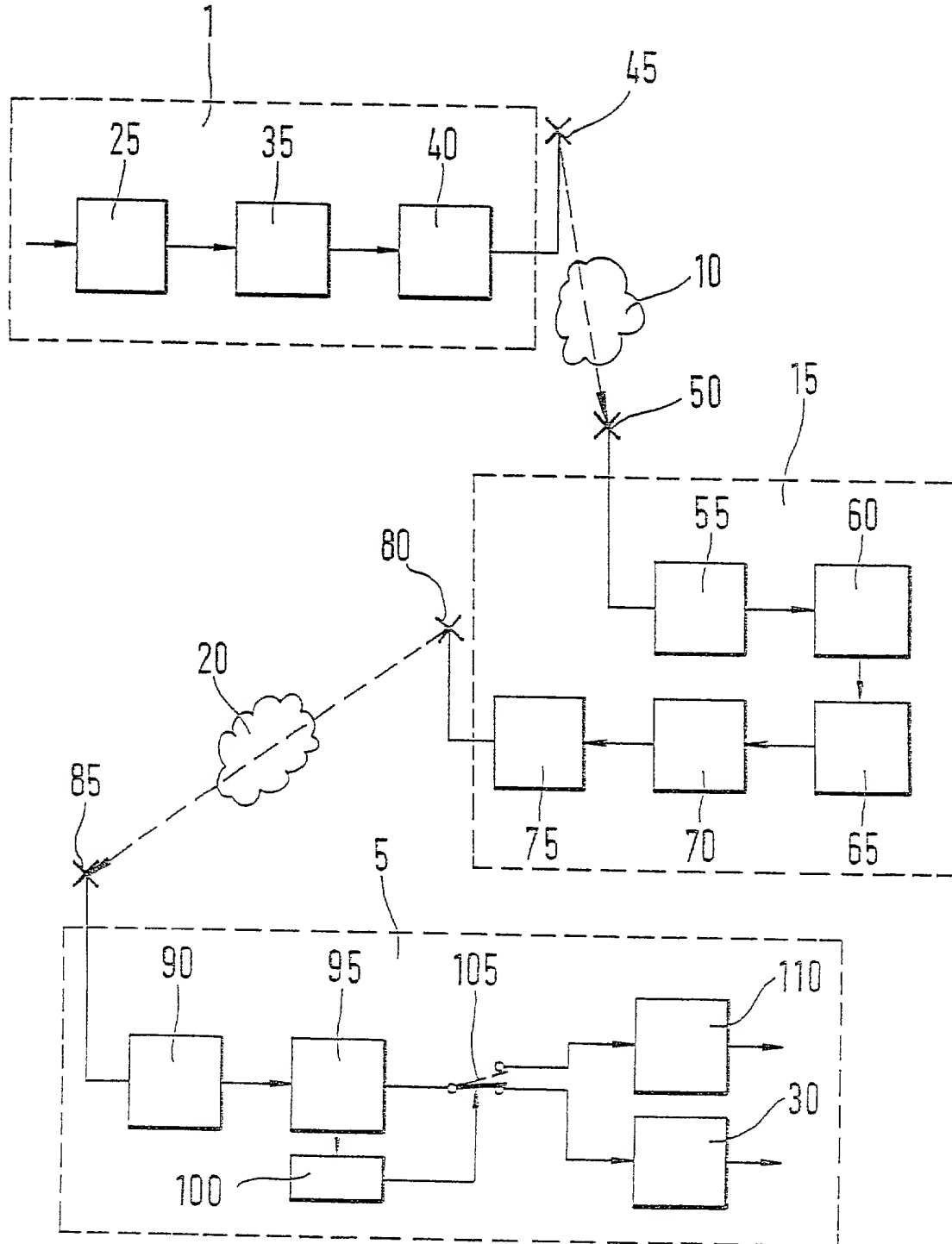
Communications), encoded, preferably source encoded and channel encoded, in the first and second step, that the useful data in the second telecommunication network are encoded, preferably channel encoded, in the second step and are transmitted in accordance with a second mobile radio standard, in particular in accordance with the UMTS standard (Universal Mobile Telecommunications System), together with the signalization data, which include information regarding the encoding of the useful data in the first step in accordance with the first mobile radio standard, and that the useful data, which are decoded, preferably channel decoded, by the second mobile station (5) in the second step, are decoded, preferably source decoded, by the second mobile station (5) in accordance with the first mobile radio standard after the evaluation of the signalization data.

7. The method according to claim 5 or 6, characterized in that the useful data in the first mobile station (1) are source encoded by a voice encoder (25) in accordance with the first mobile radio standard, in particular in accordance with the GSM standard ITU-T G.729 and that the useful data in the second mobile station (5) are source decoded by a voice decoder (30) in accordance with the first mobile radio standard.

Abstract

A method for transmitting useful digital data from a first mobile station (1) to a second mobile station (5) has been proposed, which saves on computing costs and prevents data loss. For the transmission in a first telecommunication network (10), the first mobile station (1) encodes, preferably source encodes, the useful data in a first step and encodes, preferably channel encodes, the useful data in a second step. The useful data encoded in the first and second steps are transmitted in the form of a bit stream to an intermediary station (15) via a transmission channel of the first telecommunication network (10), in particular via at least one third telecommunication network. The useful data of the first bit stream are decoded, preferably channel decoded, by the intermediary station (15) in the second step. For the transmission in a second telecommunication network (20), the useful data are encoded, preferably channel encoded, by the intermediary station (15) in the second step. The useful data are transmitted to the second mobile station (5) via a transmission channel of the second telecommunication network (20). The signalization data are transmitted from the intermediary station (15) to the second mobile station (5), wherein the signalization data contain information regarding the type of encoding of the useful

data in the first step. The useful data are decoded, preferably channel decoded, by the second mobile station (5) in the second step. The useful data decoded by the second mobile station (5) in the second step are decoded, preferably source decoded, by the second mobile station (5) in the first step, depending on the signalization data received by the second mobile station (5).



DECLARATION AND POWER OF ATTORNEY FOR NATIONAL STAGE OF PCT PATENT APPLICATION

As a below-named inventor, I hereby declare that:

Dirk LAPPE
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My residence, post office address and citizenship are as stated below next to my name.

I believe I am the original, first and sole inventor (if only name is listed below) or an original, first and joint inventor (if plural names are listed below) of the subject matter which is claimed and for which a patent is sought on the invention entitled **METHOD FOR TRANSMITTING USEFUL DIGITAL DATA** the specification of which was filed as PCT International Application number PCT/DE 99/02245 on July 23 1999.

I hereby state that I believe the named inventor or inventors in this Declaration to be the original and first inventor or inventors of the subject matter which is claimed and for which a patent is sought.

I hereby state that I have reviewed and understand the contents of the above-identified specification, including the claims, as amended by any amendment referred to above.

I acknowledge the duty to disclose all information which is material to the patentability of this application in accordance with Title 37, Code of Federal Regulations, Section 1.56.

I hereby claim foreign priority benefits under Title 35, United States Code, Section 119(a)-(d) or Section 365 (b) of any foreign application(s) for patent or inventor's certificate, or Section 365(a) of any PCT International application which designated at least one country other than the United States, listed below and have also identified below, by checking the box, any foreign application for patent or inventor's certificate or PCT International application having a filing date before that of the application on which priority is claimed.

Prior foreign application(s):

Priority claimed:

<u>198 33 318.8</u>	<u>GERMANY</u>	<u>JULY 24, 1998</u>	<u>X</u>	
(Number)	(Country)	(Date filed)	Yes	No
<u> </u>	<u> </u>	<u> </u>	<u> </u>	<u> </u>
(Number)	(Country)	(Date filed)	Yes	No

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I hereby declare that all statements made herein of my own knowledge are true and that all statements made on information and belief are believed to be true; and further that these statements were made with the knowledge that wilful false statements and the like so made are punishable by fine or imprisonment,

or both, under Section 1001 of Title 18 of the United States Code and that such wilful false statement may jeopardize the validity of the application or any patent issued thereon.

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